The Beagle, Records of the Northern Territory Museum of Arts and Sciences, 1992 9(1):115-142

THE CURRAMULKA LOCAL FAUNA: A NEW LATE TERTIARY FOSSIL ASSEMBLAGE FROM YORKE PENINSULA, SOUTH AUSTRALIA.

NEVILLE S. PLEDGE

South Australian Museum,
North Terrace, Adelaide, SA 5000, Australia.

ABSTRACT

Discovery of fossil bones in the unflushed core of a joint-controlled cave at Curramulka, Yorke Peninsula, has revealed a rich and diverse vertebrate fauna, consisting of at least 27 species, most of which are marsupials. A preliminary list is given, in which few taxa are identified to a specific level. Several new species are recognized, but most, except a giant koala, a giant ringtail and a new species of *Simosthenurus*, are not named or described in detail, pending the discovery of more diagnostic material. The apparent absence of several taxa, *viz.* bandicoots and rodents, is discussed in view of the postulated Pliocene, or even late Miocene, age suggested by the generic composition of the fauna.

KEYWORDS: Tertiary, cave, Curramulka, vertebrates, marsupials, Miocene-Pliocene, arboreal, new species, new genera.

INTRODUCTION

Curramulka is a small farming town in the middle of a topographic basin of flat-lying Lower Cambrian Parara and Kulpara Limestones (Crawford 1965, Daily 1957) in central Yorke Peninsula (Fig. 1), South Australia. These limestones contain two caves, known from earliest times of settlement (e.g. Griffiths 1988). Near the centre of the town is Town, or Town Well, Cave (5Y2) with a 30 m shaft down to water, which for many years provided the town's water supply. About 3 km south, on a hill-top near the basin rim, is the small doline of another cave, known variously as Correll's or Corra Lynn (5Y1) (Fig. 2). About midway between these caves is the local council quarry, still occasionally worked for road-metal. Both caves are joint-controlled, and sediment-filled joint fissures are visible in the quarry.

Bones of a (?late) Pleistocene vertebrate fauna can occasionally be found in breccia in some of the quarry fissures, and late Pleistocene fossils have been collected by the South Australian Museum from Town Well Cave. The latter has also yielded a surficial deposit of Holocene subfossils, and a single tooth of a diminutive marsupial lion, *Thylacoleo hilli* Pledge, 1977, of postulated Pliocene or earlier age, which was cemented to the wall in a distant passage.

Corra Lynn Cave is on private land, with severely restricted access negotiable only through the Cave Exploration Group of South Australia. Known for more than a century, it had long been visited by locals seeking a different thrill. Yet until recently, cavers rarely ventured beyond the larger passages close to the entrance, and while collections, mainly of skulls of the locally-extinct potoroid *Bettongia lesueur* (Quoy and Gaimard) were made in 1955 and 1964, no truly fossil material had been encountered. About sixteen years ago, members of the Cave Exploration Group of South Australia (CEGSA), particularly Messrs I. Lewis, G. Pilkington and M. Meth, began detailed surveys of this cave, in the process finding and excavating hundreds of metres of choked passages. Compilation and plotting of the many weekend surveys produced an intriguing picture. The cave was seen to be a three-dimensional joint-controlled maze, on at least three levels, with (by 1985) more than twelve kilometres of passage fitting within a surface area of only 450 x 205 m (11.25 ha) and a depth of 40 m). Within this system, there was a blank zone that had not been penetrated. Deliberate searching eventually found a route into this region, and resulted in the recovery of the first vertebrate fossils from the cave.

The first fossils to be brought out, in January 1985, represented several small macropodids and a fragment of *Protemnodon* sp. Upon request for more and better material, Pilkington shortly afterward (9 March 1985) recovered a spectacular specimen of a giant koala (Pledge 1985a, Anon. 1985a, 1985b). Subsequently (30 March 1985), the author was taken to the area, a one-way journey taking about 1 hours, much of it spent crawling through very low 'flatteners' (Fig.2). This difficulty of access means that only small quantities of bone and silt can be brought out at any time. On that and several later trips (e.g. Pilkington 1985), more specimens were collected with the faunal list growing to at least 27 taxa (Table 1).

Two new genera and three new species are described, and a new descriptive term-of-convenience, the 'endocristid', is introduced. The endocristid is defined as a continuous longitudinal, full-length blade formed on the lingual edge of lower molars by the concurrence of pre- and postmetacristids and pre- and postentocristids with no break or gap at the mesostylid. It is distinguished from the entocristids which derive solely from the entoconid and are restricted to the posterolingual quarter of the lower tooth, by the spelling of the term, and is the analogue of the 'ectoloph' of upper molars.

The material is all registered in the Palaeontological Collections of the South Australian Museum, prefix SAM P.

Fig. 1. Locality map.

SYSTEMATICS

Class Amphibia
Order Anura
Neobatrachus pictus Peters

Tyler (1988) referred specimen SAM P27928, a right ilium, to this living species. The only other frog material found is an unidentifiable propodial.

Class Reptilia
Order Chelonia
Family Chelidae sp. indet.

This family is represented by two fragments of plastron which are insufficient for further identification.

Family Meiolaniidae
? *Meiolania* Owen

Two fragments of large, unsculptured carapace may represent this extinct armoured land tortoise. The genus is widespread in north-eastern Australia, from Gulgong (the Miocene or Pliocene Canadian Deep Leads) to Riversleigh (early Miocene) and the Lake Eyre region (Oligocene to Miocene) to Lord Howe Island (Late Pleistocene/Holocene) and Walpole Island. If valid, this record extends the range considerably southwards.

Order Squamata
Family Madtsoiidae
Wonambi Smith
Wonambi sp. cf. *W. naracoortensis* Smith
(Fig. 3)

Some twenty vertebrae of this large, primitive, Gondwanan boid snake have been collected, together with several rib fragments and a few teeth. A fragment of pterygoid with three teeth (P31801) and an edentulous fragment of maxilla (P31785) have also been recognized. Since the remains have been found in several widely separated localities around the deposit, the species seems to have been fairly common. *Wonambi naracoortensis* is known from the Late Pleistocene at Naracoorte (Smith 1976, Barrie 1990) and has also been found in the Plio-Pleistocene Kanunka Local Fauna of the Katipiri

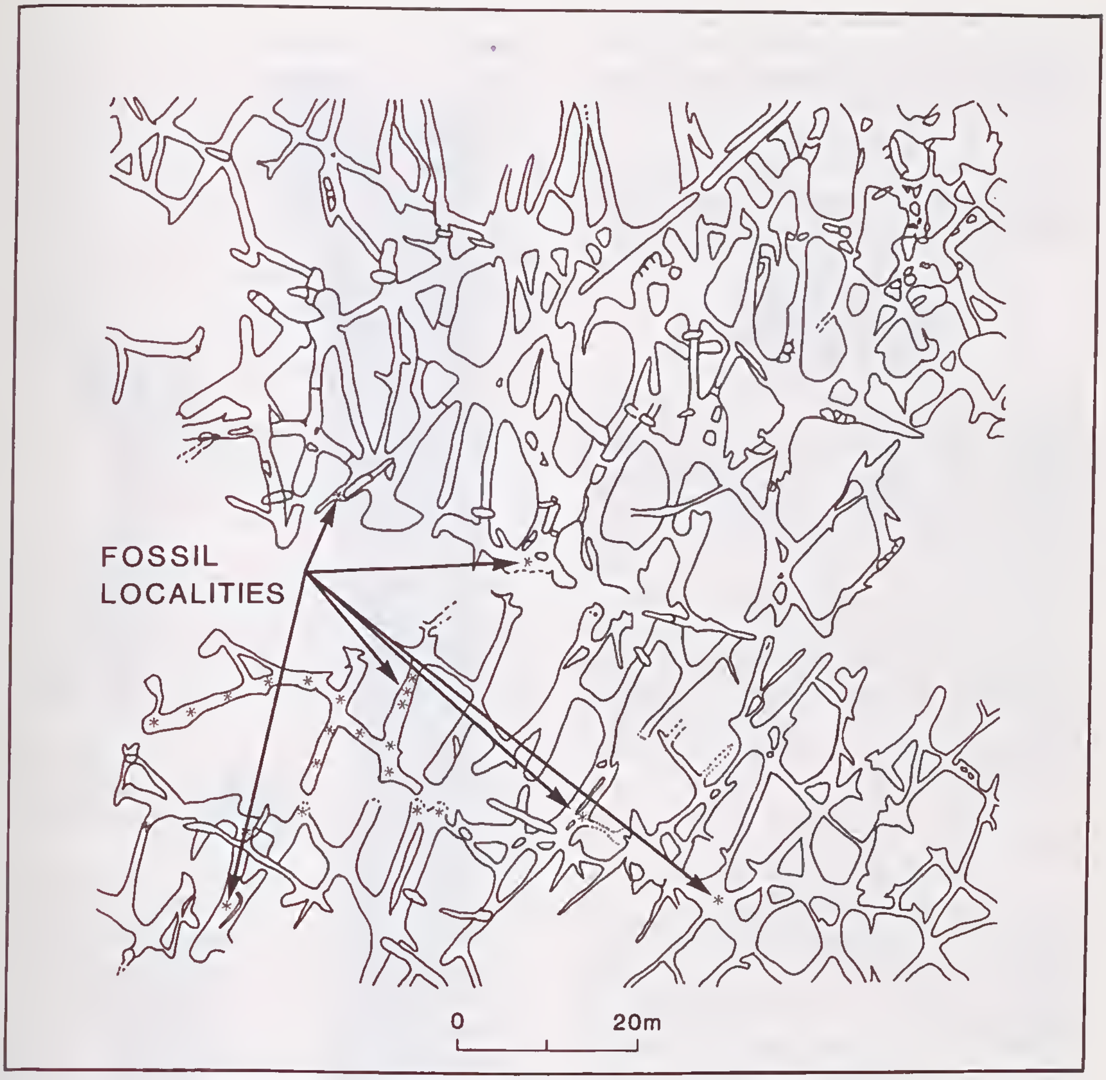

Fig. 2. Detail of a small part (100 m x 100 m) of the fossil bearing level of Corra Lynn Cave 5Y1.

Table 1. Faunal list for the Curramuka Local Fauna, Corra Lynn Cave.

AMPHIBIA	*Neobatrachus pictus*
CHELONIA	Chelidae sp. indet.
	?*Meiolania*
SQUAMATA	*Wonambi* sp.
	Elapidae sp. indet.
	Varanus sp.
Scincidae	*Tiliqua* sp. cf. *T. scincoides*
AVES	cf. *Ilbandornis* sp.
MARSUPIALIA	
Dasyuridae	cf. *Dasyuroides/Dasycercus* sp.
	cf. *Glaucodon* sp.
Thylacinidae	*Thylacinus* sp.
Phascolarctidae	*Phascolarctos* sp. cf. *P. cinereus*
	Cundokoala yorkensis gen. et sp. nov.
MARSUPIALIA (cont.)	
Diprotodontidae	Zygomaturine sp. indet.
Palorchestidae	*Palorchestes* sp. cf. *P. painei*
Vombatidae	*Vombatus* sp. indet.
	Phascolonus sp.
	Phascolamys sp. cf. *P. medius*
	Vombatidae sp. indet.
Thylacoleonidae	*Thylacoleo* sp. cf. *T. hilli*
Pseudocheiridae	*Corracheirus curramulkensis* gen. et sp. nov.
Petauridae	*Petaurus* sp. cf. *P. norfolcensis*
Potoroidae	*Potorous* sp.
Macropodidae	cf. *Baringa* sp.
	cf. *Baringa nelsonensis*
	Traposodon sp. cf. *T. bowensis*
	Protemnodon sp.
	Simosthenurus cegsai sp. nov.

Sands at Lake Kanunka. Other madtsoiid species are known from the Oligo-Miocene deposits at Riversleigh, north-western Queensland (Scanlon 1988).

Elapidae indet.

Three vertebrae referable to this family have been found.

Family Varanidae
***Varanus* Merrem**
***Varanus* sp. indet.**

Goannas are represented by an anterior caudal vertebra (SAM P29909) and a frontal bone (P30003), both of a size to indicate a head-vent length of about 600 mm (M. Hutchinson, pers. comm., 12 September 90). There is also a damaged posterior caudal vertebra.

Family Scincidae

A dentary (P29871), a fragment of vertebra and a pair of damaged frontals represent this family. The size suggests *Tiliqua* sp. cf. *T. scincoides* Shaw (M. Hutchinson, pers. comm., 14 September, 1990).

Class Aves
Family Dromornithidae
***Ilbandornis* Rich**
cf. *Ilbandornis* sp.
(Fig. 4)

Six bones have been referred to this taxon, by elimination: a large fibula (SAM P26530) lacking the distal end, an atlas vertebral centrum (SAM P26545), a damaged tibiotarsus (P31781), the proximal end of another (P31790), the head of a femur (P31791) and a toe bone (P31799). These are much larger than *Dromaius* Vieillot but smaller than *Genyornis* Stirling and correspond in size and form to *Ilbandornis* sp.. Atlas cervical vertebrae of dromornithids are rare in the fossil record, and this identification is particularly tentative. However, its presence does suggest some antiquity for the deposit. *Ilbandornis* is known from the Late Miocene Alcoota Fauna of central Australia (Rich 1979).

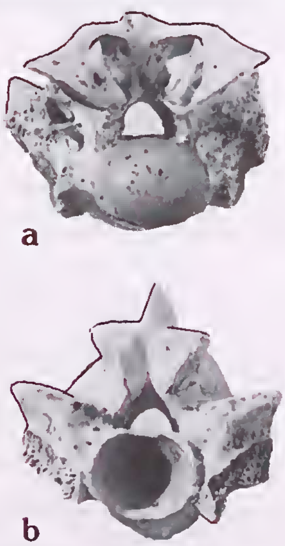

Fig. 3. Vertebrae of *Wonambi* sp. cf. *W. naracoortensis;* **a**, P 29908; **b**, P26535. Natural size.

Class Mammalia
Australidelphia
Family Dasyuridae
(Fig. 5)

Two specimens are tentatively referred to this group of Dasyurini. Of one, SAM P26527, little can be said since the broken dentary contains only M_5. The other specimen, SAM P29808, is a more complete dentary, lacking only incisive teeth and alveoli, all premolars and $M_{3,4}$. The presence of M_2, however, and the premolar alveoli allows an attempt at generic allocation. Its M_5 is similar to but slightly smaller than that of P26527.

The M_2 is similar in general size to that of *Dasyuroides byrnei* Spencer, *D. achilpatna* Archer and *Dasycercus cristicauda* (Krefft), but differs considerably in form, having a relatively large metaconid with an expanded lingual margin (making this the widest part of the tooth). The paraconid is larger and more distinct, the entoconid larger, the talonid relatively narrower and the posthypocristid shorter. M_5 is similar to that of *Dasyuroides* Spencer and *Dasycercus* Peters except in having a more open pre-post protocristid angle and a narrower trigonid. Premolar alveoli indicate a single rooted P_3 (as in *Dasyurus dunmalli* Bartholomai, 1971, and *Dasyuroides achilpatna* (Archer, 1982)), and P_1 and P_2 slightly divergent anteriorly.

Because of these features and the paucity of other characteristics, the affinities of the specimen cannot yet be determined.

***Glaucodon* Stirton**
cf. *Glaucodon* sp.

The protoconal corner of an upper molar (M^3 or M^4, SAM P26526) of a species intermediate in size between *Dasyurus maculatus* (Kerr) and

Fig. 4. Cf. *Ilbandornis* sp; **a**, fibula P26530; **b**, anterior view of atlas P26545; **c**, anterior view of tibiotarsus P31781; **d**, phalange P31799. Half natural size.

Sarcophilus laniarius (Owen) has been recognized and is tentatively referred to *Glaucodon* as the only taxon of appropriate size. Unfortunately, *Glaucodon ballaratensis* (Stirton, 1957) is known only from an incomplete dentary, found in a well at Smeaton, near Ballarat, Victoria, and believed to be of Pliocene-Pleistocene age, and from a referred dentary and M^3 from Fisherman's Cliff, near Wentworth N.S.W. (Marshall 1973). The new specimen is unfortunately too fragmentary to be closely compared with the M^3 from Fisherman's Cliff.

Family Thylacinidae
***Thylacinus* Temminck**
***Thylacinus* sp.**
(Fig. 6)

Believed to be a new species, SAM P29807 is a well-preserved but incomplete left dentary, retaining C_1, P_{1-3} and $M_{3,4}$. Its premolars are up to 10% larger than ($P_{1,2}$) or equal (P_3) to those of a modern Tasmanian sample (Dawson 1982) while its molars are about 10% smaller. In addition the premolars have a more prominent "talonid" cuspid than modern representatives, and a small anterior basal cuspid not seen in modern teeth. (Table 2).

Family Phascolarctidae
***Phascolarctos* Blainville**
***Phascolarctos* sp. cf. *P. cinereus* (Goldfuss)**
(Fig. 7)

Koalas are represented by four dentary fragments, two of which retain teeth (SAM P26513, 26514), a left M^2 (P26512) and a right maxillary with $M^{3,4}$ (P29933). These specimens are roughly the same size (Table 3) as equivalent teeth of a Queensland male koala SAM M774, and the teeth are very similar. Differences include slightly narrower and higher lower molars, thicker but more acute cusp(id)s, paracone and metacone more medial, slightly larger stylar cusps, greater development of the columnar stylids and metastylid on lower molars, flat molar occlusal plane, and (more or less) constant depth of the mandibular ramus (best seen in edentulous SAM P29932), not increasing posteriorly. There is also a humerus (P31783) which differs slightly in proportions from modern koalas.

Modern koalas show a latitudinal size variation, becoming larger in southern populations ("Bergmann's Law"), and there is considerable morphological variability, e.g. in the size and shape of premolars, but there are features in these fossils which lie outside this variability, which support a new species status. Study of this taxon is continuing.

Phascolarctidae n. gen.

The most striking taxon of this fauna is the giant koala (Pledge 1985a, Anon. 1985 a,b), whose lower molars are 50% or more longer than those of *P. cinereus* (Goldfuss). Apart from its large size and the concomitant greater massiveness of the dentary, the molars show typical phascolarctid features (e.g. selenodonty) but differ in detail. Specifically, the 'entolophid' is constructed more simply than in *P. cinereus*, and much more simply than in its contemporary 'normal' koala taxon.

Cundokoala gen. nov.

Type species. *Cundokoala yorkensis* n. sp.

Diagnosis. As for *C. yorkensis* until other species are described.

Etymology. *Cundo-*, thunder, in an aboriginal language recorded from the Yorke Peninsula (Snell, in Griffiths 1988); *-koala*: the common name, in English usage, of members of the Phascolarctidae. The allusion is to the large size of the type species. Gender is considered to be masculine.

Cundokoala yorkensis n. sp.
(Fig. 8)

Type material. HOLOTYPE: SAM P24904, a left dentary with M_{2-5} and alveolus for P_3; lacking anterior tip of jaw with incisor alveolus, and tip of ascending ramus and condyle. Collected by G. Pilkington, 9 March, 1985.

Referred Specimen. SAM P24905, a partial left M_5(?) in alveolo.

Fig. 5. Dasyurid indet. P29808. Occlusal stereopair and lateral views. Twice natural size.

Type locality. Corra Lynn Cave (5Y1), 3 km south of Curramulka, Yorke Peninsula, South Australia.

Age. Mio-Pliocene?. See discussion below.

Diagnosis. *Cundokoala yorkensis* differs from all other koalas in its very large size (Table 3), its relatively short and massive dentary, its P_3 short relative to its molars, and its M_2 being shorter than each of the other lower molars. *Cundokoala yorkensis* differs from *Phascolarctos cinereus* in that its lower molars are at least 50% larger (Table 3), and have a simpler endocristid and mesostylid, reduced columnar stylids, non-crenulated enamel in the longitudinal valley, and no plications on the cuspule in the buccal end of the transverse valley. Its M_2 bears a fine crest linking the anterior end of the protostylid crest to the protoconid (and not to the paraconid). It differs from *P. maris* Pledge, 1987a, in that its lower molars are 30% larger and have much simpler endocristid and mesostylid, much simpler columnar stylids, almost no entoconulid, absence of plications on the buccal cuspule and relatively lower crown. It differs from *Madakoala* Woodburne, Tedford, Archer and Pledge in that its lower molars are much larger, have more prominent columnar stylids, lack protoconid-metaconid and hypoconid-entoconid crests, and have a much greater protostylid on M_2. It differs from *Perikoala* Stirton (Woodburne *et al.* 1987) in its lower molars being much larger, having a stronger continuous endocristid, greater development of selenodonty, slightly stronger columnar stylids, no protoconid-metaconid or hypoconid-entoconid crests, no crenulated enamel, and having a blunter anterior end on M_2, and greater development of the protostylid. It differs from *Litokoala kanunkaensis* Springer in that its lower molars are very much larger, have greater development of columnar stylids, lesser separation of the protoconid and metaconid, hypoconid and entoconid relative to their widths, sharper posterolingual corner, and no crenulated enamel.

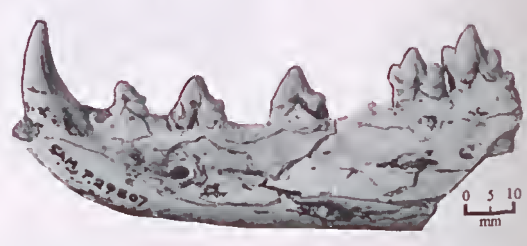

Fig. 6. *Thylacinus* sp. P29807. Lateral view, x 0.7.

Table 2. Measurements in millimetres of *Thylacinus* sp. SAM P29807 compared with ranges of *T. cynocephalus* from Tasmania (modern) and Wellington Caves (Pleistocene), after Dawson (1982) and *T. potens*, from Woodburne (1967b).

	P_1	P_2	P_3	M_2	M_3	M_4	M_5
P29807	6.6 x 3.4	9.4 x 4.2	10.5 x 4.5	10.0 x 6.2	11.0 x 6.3	12.0 x 6.4	-
Tasmanian	6.0 x 3.4	9.1 x 4.1	10.6 x 5.0	9.6 x 4.4	12.0 x 5.7	14.1 x 6.9	15.7 x 7.6
Wellington Caves	7.8 x -	10.0 x -	12.2 x -	10.7 x 5.1	13.1 x 6.3	15.2 x 7.5	17.4 x 8.5
T. potens					13.0 x 6.8	14.5 x 8.3	15.4 x 8.8

Description. SAM P24904 is a left dentary bearing four molar teeth, and lacking the anterior extremity with the incisive alveolus, and most of the ascending ramus including the condyle, coronoid and angular processes and the posterior masseteric eminence. The digastric process is also damaged. The overall preserved length is 91 mm, with the molar tooth row length being 48.8 mm and the depth of the mandible at M_5 being 34 mm. A short premolar is represented by two alveoli spanning a length of about 6 mm, beyond which point the jaw is broken. There is a small posterior mental foramen below the posterior root of M_3 but no trace of the anterior foramen.

Fig. 7. *Phascolarctos* sp. cf. *P. cinereus*, stereopairs; **a**, maxilla P29933; **b**, dentary P26514. Occlusal views, natural size.

Toothwear ranges from Tedford's (1966) medial wear stage on M_2 to early wear on M_5. The lingual faces of M_2 and M_3 have been slightly damaged by enamel flaking. M_2 is shorter than the other molars and the anterior moiety is noticeably narrower. The anterolingual corner is unfortunately damaged, with the paraconid missing. The high degree of wear has also united the protoconid and metaconid into a single basin. Nevertheless the endocristid can be seen to give only a simple flexure at the metastylid. The columnar stylids evince only slight bulges on the lingual face of metaconid and entoconid. The cristid obliqua curves lingually from the hypoconid, extends two short posterior spurs at the midpoint of the tooth, then meets the postprotocristid. The preprotocristid extends to the paraconid but, less than halfway there, produces a fine anterobuccal crest that meets the anterior end of the preprotostylidcrista. This feature differs from all other koala M_2s. The postprotostylidcrista curves lingually at its posterior end. There is a rather amorphous entoconulid at the posterior end of the longitudinal valley, rather similar to but not as developed as that shown in the M_3 or M_4 of *Phascolarctos maris* (Pledge, 1987a). This feature diminishes in size in posterior teeth and is virtually absent in M_5. Posterior molars are similar. The longitudinal valley is noticeably smooth, with only a slight plication where the cristid obliqua meets the postprotocristid. The metastylid is a simple flexure with the slightest discontinuity where the preentocristid meets the buccal face of the end of the postmetacristid. The posthypocristid flows into the postcingulum with only a minor anterior spur for the entoconulid. The preprotocristid converges with but does not reach the parametacristid, there being a separation of about 1.55 mm. Columnar stylids are represented only by lingual swellings on the metaconid and entoconid, unlike the extreme elaborations on *Phascolarctos maris*, or even the lesser ones on *P. cinereus*.

Discussion. Because of its size, *Cundokoala yorkensis* is readily distinguished from all other koalas. The only taxa approaching it in size are

Phascolarctos maris, which is morphologically distinct as well as being smaller, and *P. stirtoni*, whose lower molars are unknown. However, because there is a clear equivalent relationship between the lengths of upper and lower molars of all species where both are known, it is immediately apparent that *P. stirtoni* is too small to be this species or even to be considered a senior synonym of the smaller *P. maris*. The morphological simplicity of the lower molars of *Cundokoala yorkensis* also suggest, by analogy with *Phascolarctos cinereus,* that its upper molars are similarly less complicated than those of *Phascolarctos* species

Etymology. This species is named for Yorke Peninsula where it was found.

Family Diprotodontidae
Diprotodontid spp. indet.
(Fig. 9)

There are nine teeth that can be referred to this family, but because they are isolated and mostly broken, it is difficult to identify them further. The material comprises an upper incisor (P29937), upper premolar (P26539), two lower incisors (P29942, 31333), two imperfect lower molars that could be associated (P29934-5), two posterior halves of lower molars (P26538, 29904), and an enamel-less fragment with one root of an upper molar (P26540).

The upper incisor seems to be a right I^1. It has a generally zygomaturine form although it is much less compressed laterally. It is highly

Table 3. Length x width measurements in millimetres of teeth of *Cundokoala yorkensis* n.g., n.sp. and *Phascolarctos* sp. cf. *P. cinereus* compared with average *P. cinereus*: e = estimated measurement (alaveolar in P24904).

	P^3	M_2	M_3	M_4	M_5
Cundokoala yorkensis					
P24904	6.0e	11.8 x 9.0	12.9 x 8.8	12.9 x 8.9	12.7 x 8.6
P24905	-	-	-	-	(13.0 x 8.5)e
Phascolaractos sp. cf. *P. cinereus*					
P26512	-	8.0 x 8.0	-	-	-
P29933 (upper right)	-	-	8.0 x 8.1	7.5 x 7.6	-
P26514 (left dentary)	7.0 x 4.1	7.8 x 5.1	7.7 x 5.1	7.6 x 5.0	7.6 x 4.5
P26513 (left dentary)	-	-	-	-	8.0 x 4.8
P. cinereus (upper)	7.3 x 5.1	8.0 x 7.7	7.7 x 8.0	7.4 x 7.4	6.6 x 6.5
(lower)	6.4 x 4.1	7.9 x 5.4	8.2 x 5.3	8.2 x 5.1	8.0 x 5.0

Fig. 8. *Cundokoala yorkensis* gen. et sp. nov.; dentary in occlusal (stereopair) and lateral view. Natural size.

curved with an external radius of about 35 mm. The rather D-shaped or triangular crown cross-section slightly resembles the I^1 of *Pyramios alcootense* Woodburne, and I^2 of *Kolopsis torus* Woodburne (Woodburne 1967a). In size it agrees with *P. alcootense* best, but it lacks the smooth curve of the lateral surface. There is a faint groove in the labial third of the outer enamel surface, fading out before the base of the enamel, which agrees with I^2 of *K. torus*, but the Curramulka specimen is much larger (Table 4).

The premolar P26539, although damaged and lacking the posterolingual corner, is distinctly zygomaturine in form. It resembles both *Kolopsis* Woodburne and *Zygomaturus* Macleay in general form, though with differences in detail, but is much smaller than P^3 of *Zygomaturus* and has a distinctly transverse parastyle. It is approximately the same size as *Kolopsis*. There is also a close resemblance to certain features of *Alkwertatherium webbi* Murray, 1990, such as size, general shape, large high transversely ovate to bladed parastyle, and distinct mesostyle. It differs from that species, however, in possessing an elongate bladed parametacone, and no buccal cingulum extending from the mesostyle to form a fossette. Unfortunately, the posterolingual corner of the tooth is missing and it is therefore not possible to determine whether there was a hypocone as in *Kolopsis* and *Zygomaturus*, or none as in *Alkwertatherium* Murray. It differs from species of *Zygomaturus* and *Kolopsis* in having a transversely bladed parastyle, rather than a large, regularly conical one. The poorly preserved fragment of upper molar tells nothing except that it is big enough to be from *Zygomaturus* or the large extreme of *Pyramios*.

The lower incisors are very similar except that P31333 is fairly worn and P29942 is only the enamel sheath of an unworn tooth. The latter shows a form very similar to that of *Pyramios alcootense*, although it is considerably smaller than that species. It matches neither size nor proportions of I_1 of *Kolopsis* species or *Plaisiodon centralis* Woodburne.

The lower molars P29934 and P29935 are apparently associated, having been collected at the same site, and having similar preservation and well-fitting interdental appression facets. They are unfortunately badly damaged and lack much of the enamel on the sides of the teeth. Nevertheless, length and approximate width measurements are possible. The size of these teeth immediately rules out *Kolopsis* and *Zygomaturus* (they are too large and too small respectively), but they fit the ranges of M_2 and M_3 respectively of *Plaisiodon centralis*. However, the morphology of the postulated M_2 does not match that illustrated (Woodburne 1967a, fig. 7 M_T), having a wider protolophid. In this it resembles *Pyramios alcootense*, but the development of the cristid obliqua, which extends almost to the midline in both molars, is closer to that of *P. centralis*. It is conceivable that P29934-5 are in fact $M_{3,4}$ of a small *Plaisiodon* sp. This interpretation avoids the problem of the wide protolophid in P29934.

There is too great a size difference between P29935 and the molar fragments P26538 and P29904 for them to be considered to be the same taxon, particularly if the first is M_4, since P26538 bears a well developed interdental appression facet indicating that it can be no more than M_4 itself. Having only the hypolophid width to judge from, these fragments can be referred to M_4 of *Zygomaturus keanei* Stirton (Table 4).

It is therefore apparent that the specimens at hand represent several diprotodontid species, but there is not yet enough complete material to differentiate and identify them adequately.

Family Palorchestidae
***Palorchestes* Owen**
***Palorchestes* sp. cf. *P. painei* Woodburne**
(Fig. 10)

Palorchestes is represented by three upper molars (SAM P26536, 29859, 29938), four lower molars (SAM P29860, 29940, 29999, 30000), a left lower incisor (SAM P29941), and possibly an upper incisor (I^3 SAM P29864). There are also two ungual phalanges (P26537, 29893) believed to belong to this species.

Measurements of the molars (Pledge, 1991) suggest that this taxon is intermediate between *P. painei* Woodburne and *P. parvus* De Vis, with the distinctly low crowns aligning the specimens with *P. painei*. However, it is becoming apparent that the composition and phylogeny of *Palorchestes* is more complex than previously thought (e.g. Woods 1958, Woodburne 1967b), so allocation of this material is tentative.

Family Vombatidae
***Vombatus* Geoffroy**
***Vombatus* sp. indet.**
(Fig. 11)

A right upper incisor and right M^5 (P29931, length 9.5 mm) having a rounder lingual outline are ascribed to this genus, although they do not closely match *Vombatus ursinus* (Shaw).

Phascolonus Owen
Phascolonus sp. indet.

This taxon is represented by an upper incisor fragment (P26543) which resembles that of *Phascolonus gigas* Owen but is about 45% narrower with a width of 23 mm.

Phascolomys Dumeril
Phascolomys sp. cf. *P. medius* Owen

This species is also represented by an upper incisor (P29862). It is narrower (15 mm) than the *Phascolonus* tooth mentioned above, but thicker medially (8.5 mm). As such, it is close to *Phascolomys medius* Owen as tabled by Dawson (1983). A second specimen (P31797), possibly an incisor of a juvenile, is tentatively referred to this species. It has the same cross-sectional

Fig. 9. Diprotodontids undet; **a**, right upper incisor P29937; **b**, zygomaturine right upper premolar P26539; **c**, lower left incisor P31333; **d**, right lower molar P29934; **e**, right lower molar P29935; **f**, partial left lower molar P29904; **g**, partial right lower molar P26538. Natural size.

Table 4. Dimensions in millimetres of miscellaneous diprotodontid teeth from Corra Lynn Cave, compared with Mio-Pliocene species (from Woodburne 1967a, Stirton 1967, and Murray 1990).

Corra Lynn Specimens			tooth	*Pyramios alcootense*	*Kolopsis torus*	*Plaisiodon centralis*	*Alkwertatherium webbi*	*Zygomaturus keanei*
P29937	length	14	I^1	15.1 -20.4	12.3 - 17.5	13.4 - 15.3	-	28.0
	width	11		10.5 -13.3	6.8 - 10.7	10.5 - 10.9	-	19.4
P26539	length	18.4	P^3	17.4 -20.9	17.1 - 20.5	23.9 - 28.4	18.7 - 19.2	25.2 - 26.3
	width	17		16.8 -20.8	13.7 - 16.1	17.6 - 21.8	17.6 - 17.7	19.6 - 21.2
P29942	length	25.8	I_1	34.3 -35.77	13.5 - 16.6	35	-	-
	width	22.2		20.7 -28.9	22.5 - 26.3	18.0 - 21.2	-	-
P29934	length	26.7	M_3	20.9 -21.2	17.2 - 19.0	20.1 - 27.2	19.9 - 21.5	29.2 - 29.6
	width	18		14.8 -17.3	12.5 - 15.1	14.7 - 17.5	15.0 - 15.1	22.2
P29935	length	30.3	M_3	24.4 -29.7	18.7 - 21.6	25.5 - 31.5	23.9 - 26.2	34.0 - 37.7
	width	20		16.1 -21.4	13.8 - 16.0	18.0 - 21.7	-	25.9 - 28.3
P26538	length	-	M_4	27.2 -36.1	21.8 - 25.8	29.9 - 34.6	25.5 - 28.2	40.2 - 42.8
	width	27.5		18.2 -24.9	15.5 - 18.1	21.0 - 24.3	18.3	28.2 - 29.7
			M_5	30.1 -35.8	22.1 - 27.0	25.8 - 37.6	26.2 - 27.5	43.3 - 43.7
				19.8 -32.6	17.3 - 21.0	23.6 - 27.1	19.5 - 20.5	31.4 - 32.7

shape, but a tapering width of 8.5 to 10 mm and thickness of 5.6 mm.

Vombatidae indet.

Two specimens have not been allocated to a genus. One is a segment of premolar, roundly triangular in section with no vertical grooves. Length and width are subequal, about 8 mm. The other specimen is half of a large molar, though smaller than *Phascolonus gigas*, and with a rounded outline also. The transverse diameter is 8.6 mm, and the (half) length is about 7 mm.

Family Thylacoleonidae
Thylacoleo Owen
Thylacoleo sp. cf. *T. hilli* Pledge

Thylacoleo hilli Pledge was discovered in nearby Town Well Cave, and consists solely of an upper premolar (Pledge 1977). The material from Corra Lynn Cave is, so far, even less diagnostic. SAM P26522 is the tip of a barely worn left I_1, smaller, more gracile and more acute than the equivalent tooth of *T. carnifex* Owen. P29913 is an unworn right I^1, also smaller than the equivalent of *T. carnifex*, and preserving the characteristic little medial cusp. The teeth are noticeably smaller than those of *T. carnifex* and accordingly are referred to *T. hilli* as being the appropriately-sized species.

A slightly damaged astragalus P26523 is considered to be from *Thylacoleo* and is somewhat smaller than the average adult Pleistocene specimens from Naracoorte. It is possible that one or other (or both) of the ungual phalanges ascribed to *Palorchestes* (above) is in reality from *Thylacoleo*, with the bony sheath entirely broken away.

Family Pseudocheiridae

Another striking species in this fauna is a giant ringtail possum with a dentary (SAM P26542, P31792) as large as that of a modern koala. This differs in detail of molar morphology from all modern species at hand.

Corracheirus gen. nov.

Type Species. *Corracheirus curramulkensis* n. sp.

Diagnosis. As for *C. curramulkensis* until other species are described.

Etymology. *Corra-*, from the name of the cave (Corra Lynn Cave) - the type locality; *-cheirus*, from *Pseudocheirus*, a genus of ringtail possum.

Corracheirus curramulkensis n. sp.
(Fig. 12)

Type Material. HOLOTYPE: SAM P26542, a right dentary lacking P_3 and the anterior part of M_2. Paratype: SAM P31792, a left dentary with P_{3-4}.

Referred Specimens. SAM P29901, a fragment of right dentary with P_3; P26520 a right lower incisor.

Type locality. Corra Lynn Cave (5Y1), 3 km south of Curramulka, Yorke Peninsula, South Australia.

Diagnosis. A giant ringtail possum with molar teeth twice the length of the modern *Pseudocheirus peregrinus* Boddaert and 20% larger than *Pseudokoala erlita* Turnbull and Lundelius (Table 5). Differs from *P. peregrinus* in having rounder, less angular, less acute protoconid and hypoconid crests, protoconid and hy-

Fig. 10. *Palorchestes* sp. cf. *P. painei*, **a**, **b**, outer and inner views of lower incisor P29941; **c-e**, stereo occlusal views of upper molars and, **f-i** lower molars: **c**, P29938; **d**, P26536; **e**, P29859; **f**, P29940; **g**, P29905; **h**, P30000; **i**, P29999. Natural size.

poconid level with metaconid and entoconid respectively, postprotocristid continuous with prehypocristid (cristid obliqua), not extending to metastylid; lingual face of endocristid almost flat at metaconid and entoconid; simple metastylid flexure of endocristid, crenulations within the trigonid and talonid basins and a short premolar. Differs from *Pseudokoala erlita* in being larger, having postprotocristid continuous with cristid obliqua and not extending to metastylid, in having a continuous endocristid with simple metastylid flexure, in having simple low protoconid and hypoconid; and shorter broader premolar. Differs from *Pseudochirops archeri* Collett in being twice as large, having rounder protoconid and hypoconid crests; protoconid level with metaconid, hypoconid with entoconid; much simpler endocristid, thinner metaconid and entoconid, with crests less diagonal, continuous postprotocristid and cristid obliqua, absence of entostylid and other basinal crenulations, shorter P_3, and absence of P_2/I_2. Differs from *Hemibelideus lemuroides* (Collett) in being twice as large, having slightly more angular protoconid and hypoconid crests with the cuspids being the buccalmost points, endocristid less diagonal, thinner metaconid and entoconid, continuous postprotocristid and cristid obliqua, anterolingual cingulum reduced and only on M_3, and shorter P_3. Differs from *Petauroides volans* (Kerr) in being twice as large, protoconid level with metaconid, hypoconid with entoconid, precristids less convex, endocristid with simpler metastylid unconnected to postprotocristid, and postprotocristid continuous with cristid obliqua. Differs from *Pildra magnus* Pledge, 1987b, (from the Oligo-Miocene Ngama Local Fauna of the Etadunna Formation) in being twice as large; in having a continuous well-developed endocristid with a metastylid flexure and incorporating the entoconid; and with rounded protoconid and hypoconid crests. Differs from *Marlu kutjamarpensis*

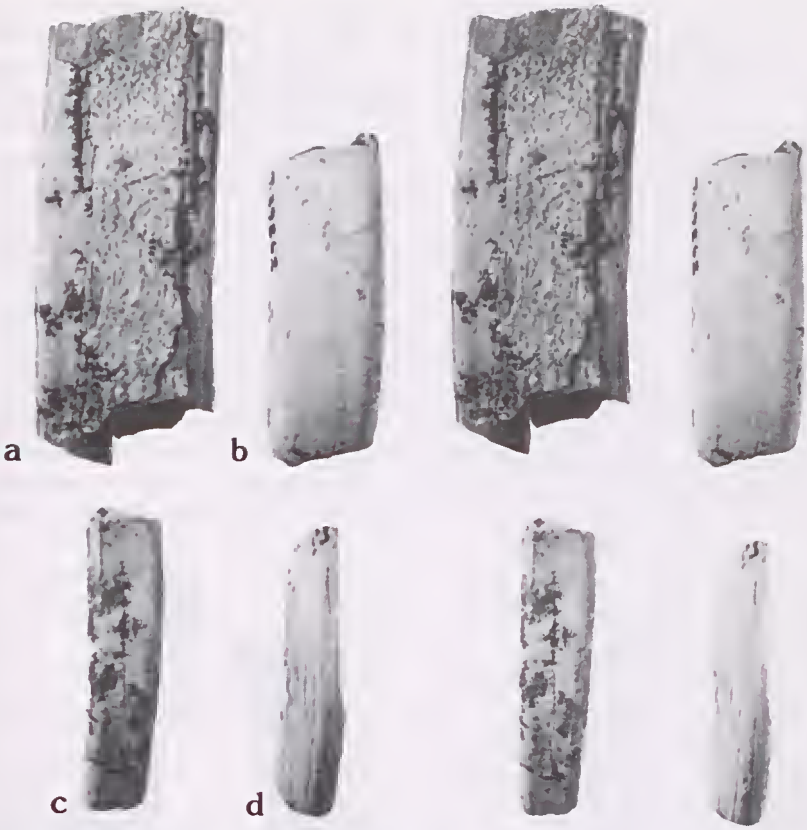

Fig. 11. Vombatids, outer views of upper incisors, stereopairs; a, *Phascolonus* sp. P26543; **b**, *Phascolomys* sp. cf. *P. medius* P29862; **c**, P31797; **d**, *Vombatus* sp. indet. P29931. Natural size.

Woodburne *et al.* (from the mid Miocene Kutjamarpu local fauna of the Wipajiri Formation) in much larger size (2 - 3x), having a continuous endocristid with a connection between slightly overlapping postmetacristid and pre-entocristid, and lacking I_2/P_1.

Description. SAM P26542 is an almost complete dentary, lacking only the incisor, P_3, the anterior half of M_2, and the upper part of the ascending ramus. The incisor root is broken off and shows this tooth to have been greatly compressed laterally. The incisor P26520 is referred to this species by being of the right size, being similar in appearance to *Pseudocheirus* Ogilby and being unlike any of the macropodids. It differs from *Pseudocheirus peregrinus* in having a relatively shorter spatulate bladed crown represented by the unworn referred specimen P26520 (total length 28.2 mm, enamel length about 13 mm).

The dentary is relatively deep-bodied compared with *P. peregrinus*, with the ascending ramus not vertical at the leading edge, but at about 80° to the dental plane. The angular process is much reduced, not extending behind the condyle while the posterior masseteric eminence does so, unlike *P. peregrinus*. The masseteric fossa is strongly delineated ventrally and posteriorly. The broad condyle itself may be deformed or pathological since its flat articular surface shows a postero-lateral and a medial moiety separated by a deep groove; it is rela-

Table 5. Dimensions of cheek teeth (in millimetres) of *Corracheirus curramulkensis* n.g., n.sp.

	P_3 (alveolus)	M_2	M_3	M_4	M_5
P26542(holotype)					
length	2.5	>6.5	8.6	8.1	8.2
anterior width	2.0	4.5	5.0	4.8	4.5
posterior width	2.9	5.2	5.0	4.5	4.1
P29901 (referred)					
length		9.3			
anterior width	-	5.3	-	-	
posterior width		5.6			
P31792(paratype)					
length		8.5	8.2		
anterior width	-	5.2	5.3	-	
posterior width		5.5	5.0		

tively low and has little neck. The mandibular foramen is higher than in *P. peregrinus,* lying just below the level of the teeth. A small mental foramen opens below the anterior part of M_2. The ventral profile of the jaw is similar to *P. peregrinus,* but the incisor may rise more sharply. The symphysis extends back to the level of M_3, unlike *P. peregrinus.* There is a short diastema of 6 mm between incisor and P_3, with no indication of the tiny anterior premolars seen in *P. peregrinus.* The dentary is larger than that of *Pseudokoala erlita,* and only generally similar, having a more convex ventral profile, straight alveolar profile and more procumbent less tilted incisor. Measurements are as follows: dentary length (incisor alveolus) parallel to tooth row, 66 mm; depth at M_3, 18 mm; symphysis length, >17 mm; length of ascending ramus at occlusal level, 29 mm; transverse width at angular process, 20 mm; alveolar tooth row length P_3-M_5, 33.2 mm.

P_3 is missing, but the alveolus, measuring 2.4 mm long and 2.9 mm wide posteriorly, indicates a very short, double rooted tooth.

M_2 is damaged. The anterior quarter, bearing the protoconid, is broken off. The buccal protocristid tends slightly posteriorly. It is not clear whether the cristid obliqua fades out at the transverse valley, meets the postmetacristid, or meets a lingually directed crest from the protocristid/protoconid. The tooth is less worn than NMV P54159 of *Pseudokoala erlita* but is similar in general form except for having a straight endocristid with only a slight thickening at the metastylid, rather than an overlap of the postmetacristid and pre-entocristid. The posthypocristid is slightly convex, unlike those of

Fig. 12. *Corracheirus curramulkensis* gen. et sp. nov., dentaries; **a**, holotype P26542; **b**, referred specimen P31792; occlusal (stereopair) and lateral views. Twice natural size.

P. peregrinus and *P. erlita*. There are crenulations in the talonid basin, mostly extending posterolingually from the cristid obliqua.

The posterior molars have a similar plan. Cuspids are relatively low (although the protoconid and hypoconid appear to be attenuated when unworn: only the apices of these cusps show breached enamel). The paracristid, postprotocristid, cristid obliqua and posthypocristid are all convex buccally, giving rounded angles at the cuspids. The metaconid and entoconid support flat, bladed cristids that are continuous but overlap sigmoidally at the metastylid and are less oblique than those of *P. peregrinus* and *P. erlita*. In profile, the cuspids are obtuse. In the holotype, the postprotocristid meets the cristid obliqua at the mesostylid and does not continue to the postmetacristid (there is a very weak connection in M_4 of P31792). They are separated by a deep crevice. The posthypocristid is likewise separated from the postendocristid. The parastylid is a little in advance of, but lower than, the anterior end of the premetacristid, and is joined to it by a narrow precingulum, about one quarter tooth-width, except in M_5. There is a small but distinct low level anterobuccal cingulum (and an anterolingual cingulum on M_3) which tends to give the front of the teeth a square outline, and a low buccal cingulum at the mouth of the transverse valley. The lingual face of the endocristid is shallowly scalloped as a consequence of a slight vertical axial thickening at the metaconid and entoconid. The trigonid and talonid basins are only mutedly ornamented compared with M_2 suggesting that crenulations have not been obliterated by wear.

Discussion. *Corracheirus curramulkensis* is considered to be a species roughly contemporary with, or a little earlier than, (see Discussion and Conclusions, below) the somewhat smaller *Pseudokoala erlita* of the Hamilton Local Fauna in western Victoria (Turnbull and Lundelius 1970, Turnbull *et al.* 1987). Although there are only two or three comparable teeth, the Curramulka specimens are seen to be morphologically and mensurally distinct from the Victorian species. The differences are considered to be of generic significance, by comparison with the differences seen in the lower molars of the modern pseudocheirids, *Pseudocheirus, Pseudochirops, Petauroides* and *Hemibelideus.*

Relationships of *C. curramulkensis* with other species are, however, less easy to deduce because of the lack of knowledge about P_3 and M_2 and upper molars. On the basis of the few characters preserved in common, there may be a relationship with *Marlu kutjamarpensis* (Woodburne *et al.* 1987).

A tooth found at Marmor Quarry, southeast of Rockhampton, Queensland, closely resembles the M_5 of *Corracheirus curramulkensis* in size (length 8.0mm, width 4.1mm) and differs only in the postmetacristid and postentocristid being medially more convex and the cristid obliqua more concave. These are probably not sufficient grounds to make the Queensland specimen a different species. It should be noted that the Marmor Quarry also has yielded a fragment of molar referrable to the large koala *Phascolarctos stirtoni* Bartholomai (?M^4). This species seems also to occur in the Chinchilla Sands (Bartholomai 1968). It is thus supporting evidence for a Pliocene age.

No upper molars have yet been found in the Curramulka Local Fauna, but a fragmentary specimen from the Bow Local Fauna, Merriwa, N.S.W., has characters that are similar to this species and is described as follows. The Bow tooth lacks that part anterior to the protocone and paracone, and while not heavily worn, appears to have been tumbled and abraded so that features are somewhat obscure. It is considered to be a right M^4. Estimated length is 6.5 to 7 mm (preserved length is 5.8 mm), anterior width approximately 5.5 mm, posterior width 4.7 mm. This may be rather short for *C. curramulkensis.* The buccal face is relatively flat, with only a slight vertical ridge at the mesostyle and slightly concave above the pre- and postmetacristae, the 'ectoloph' is almost straight - a very open W. A strong posterolingual crest also extends from the paracone towards the middle of the tooth, but does not join the crista obliqua which has curved buccally to join the premetacrista just posterior of the mesostyle. A small anterior spur from the crista obliqua trends towards the posterolingual paracrista. The protocone is shorter than all other cusps and appears to give rise to a somewhat diverging set of buccally directed cristae. The postprotocrista is low and meets the crista obliqua rather low on its anterior face. The posthypocrista is almost symmetrical with the crista obliqua, except for the short anterior spur on the latter. The hypocone gives rise to a broad subdued set of three near parallel buccally directed cristae which halt at the bottom of the fossette. There is also a short posterobuccally directed crista arising from the crista obliqua opposite the anterior spur, and a similar faint eminence arising anterobuccally from the posthypocrista. The metacone has a strong lingual axial ridge defined by deep grooves. The posthypocrista does not meet the postmetacrista

- there is a gap of about one millimetre. The Bow Local Fauna is considered to be of Pliocene age.

Etymology. This species is named for the nearby town of Curramulka.

Family Petauridae
***Petaurus* Shaw**
***Petaurus* sp. cf. *P. norfolcensis* (Kerr)**
(Fig. 13)

Gliders are represented by a single right dentary (SAM P29892) preserving P_3M_{2-4}. This matches *P. norfolcensis* (Kerr) in size and general morphology, differing mainly in having a slightly longer P_3 and narrower, more acute M_2.

Family Potoroidae
***Potorous* Desmarest**
***Potorous* sp.**
(Fig. 14)

Two dentary fragments represent this taxon. SAM P26541 preserves P_3M_{2-4}, while P29925 preserves $M_{2,3}$ and unerupted M_4. The teeth are similar in size to those of *P. platyops* (Gould) (*P. morgani* Finlayson, SAM P168) but the premolar differs slightly in outline and has five ridges and cusps and much less lingual cingulum. In addition, the dentary is more massive than in the aged *P. platyops* examined and the inflection of the ventral outline is more posterior, below M_5 rather than M_3.

Family Macropodidae

Kangaroos are the most numerous taxon collected, and represent at least four species, none of which has been identified with certainty (Table 6).

***Baringa* Flannery and Hann**
Species 1: cf. *Baringa* sp.
(Fig. 15)

Eight dentaries (SAM P26547, 26548, 26550, 29863, 29902, 29923, 31337, 31794) including all teeth, and a maxilla P31788, represent this smallest species. The molar teeth are roughly the same size as those of *Thylogale thetis* Lesson and *T. stigmatica* Gould but are lower and have shorter, wider precingula. The premolar P_3 is longer and more regular in width and height, and the lower incisor is slightly smaller and possibly more spatulate. The dentary is about the same size as that of *T. billardieri* Desmarest, with perhaps a more vertical leading edge to the ascending ramus, and with a slightly shallower and more even depth below the teeth. The symphysis and diastema are shorter. There is a rather deep buccinator groove from below P_3 to the anterior half of M_4, more distinct and lower than in *Thylogale* Gray.

The alveolar margin is not arched. A sharp ridge from below the anterior edge of the ascending ramus follows outside of the ventral rim of the masseteric fossa: it is more angular and more pronounced than in *Thylogale* and *Petrogale xanthopus* Gray. In some characters - e.g. buccinator groove, masseteric rim, regular depth of dentary, form of P_3 - the species resembles the early Pleistocene *Baringa nelsonensis* Flannery and Hann 1984, but is considerably smaller.

One worn upper dentition (P31788) has been recognized, on the basis of size and form. It retains P^3M^{2-4}. The premolar is relatively long compared with the molars, unlike *B. nelsonensis*, but is similar to that species except that the posterior cusp seems to be highest and the lingual shelf is well developed.

Species 2: cf. *Baringa nelsonensis* Flannery and Hann
(Fig. 16)

This is the most numerous of the macropodid taxa with nine dentary fragments and seven referred maxillary fragments: SAM P24887, r. dentary M_{2-5}; P26510, r. maxilla, M^{1-3}; P26511, r. maxilla, $P^2M^{1,2}$; P24889, l. maxilla, P^3M^{2-3}; P26549, r. dentary P_3M_5, very worn; P26551, l. maxilla M^{3-5}; P29865, r. dentary, M_1; P29869, r. maxilla, M^{2-4}; P29903, r. maxilla, M^{2-3}; P29919,

Fig. 13. *Petaurus* sp. cf. *P. norfolcensis*, dentary P29892 in occlusal (stereopair) and lateral views. Twice natural size.

r. dentary, M_{2-4} (M_5 unerupted); P29920, r. dentary P_3M_4; P29921, r. dentary, P_2M_{1-3} (P_3 unerupted); P29922, l. dentary, $P_2(P_3)$ M_{2-4}; P29927, l. dentary, M_5 P31338, l. maxilla, $M^{1,2}$; P31789, r. dentary, M_4. As there is some size variation, this sample may not represent a single species.

The molars of this taxon are roughly the size of *Macropus irma* (Jourdan) but differ from *Macropus* Shaw in many respects. No incisor is known, but it would seem not to be procumbent as in *Macropus*. The premolar is long and bladed, as in *Petrogale* Gray, but differs in shape being of regular height and width and with no posterior expansion or hook of the crest. Of the three dentaries showing adult, fully erupted teeth, only two preserve M_5 and one of these is very worn. Nevertheless, these specimens show no great increase in size of the molars; in fact, M_5 is rather smaller than M_4. In addition, the very old individual, P26559, displays molars with the roots extending backwards beyond their crowns, as in *Dendrolagus* species. Upper premolars (P^3) have a weak lingual cingulum, less than half the length of the tooth, and a distinct posterolingual cusp. P^2 has a stronger lingual cingulum nearly full length and a weaker posterolingual cusp. Several lower incisors (P26509, 29928) may also be referred to the taxon. They are about the size and form of that of *T. billardieri*.

Measurements and morphology of the teeth are similar to *Baringa nelsonensis*, although the I_1 does not show the distinctive wear pattern ascribed to that species (Flannery and Hann 1984).

Troposodon Bartholomai
Species 3: *Troposodon* sp. cf. *T. bowensis* Flannery and Archer

(Fig. 17)

A near-complete left dentary lacking I_1 (SAM P26546), a fragment with $M_{3,4}$ (P22918), a fragment with P_2, part of unerupted P_3 and the remains of I_1 (P24888), a fragment of left dentary with P_3 and M_2 (P31793), and a fragment with unerupted left M_5 (P31795) are all that represent this species.

The species is small and appears closest to *Troposodon bluffensis* (Bartholomai, 1978) and *T. bowensis* Flannery and Archer, 1984. *Troposodon bluffensis* is known from few isolated teeth, only two of which (P_2, M_5) can be compared with the Corra Lynn material. The M_5,

Fig. 14. *Potorous* sp. undet., dentaries in stereoview; a, occlusal, P26541; b, lateral, P29925. Natural size.

although more worn, matches the size of the paratype QM F9055 while the P_3 is somewhat longer than its equivalent, has a crest less curved and lacks the posterolingual cusp.

The dentary is similar in size and profile, and presents the distinctive buccal depression below M_{2-3}, seen in *T. bowensis* (and also *T. gurar* Flannery and Archer and *T. kenti* Campbell). The teeth fall generally within the range of measurement given for *T. bowensis* (Flannery and Archer 1984), although these are on the small side, except for the P_3. While the molars fit the description for *T. bowensis*, the premolars do not. On the unworn P_2, there is no particularly distinct cuspid at the anterior end of the crest, and there are several grooves on each face, alternating to give the crest a zig-zag form. The posterior end of the crest flexes lingually, but there is no posterolingual cuspid as illustrated in Flannery and Archer (1984: Fig. 2D). P_3 is well worn in the dentary P26546, and all traces of buccal ridges have been obliterated although there seem to have been three lingually. There is no trace of the distinct anterior cuspids seen in *T. bowensis*, and although the crest flexes posterolingually, there is no posterolingual cuspid. On P31793, however, there are four buccal and four lingual ridges on the premolar, together forming a finely serrated edge but no distinct anterior cuspid or posterolingual cuspid.

Although the molars are similar in size to those of *Kurrabi mahoneyi* (Flannery and Archer 1984) they differ in the development of precingulum and midlink, the size gradation of the teeth being less, and the tooth row straighter. The premolar P_3 is also much smaller.

Protemnodon Owen
Species 4: *Protemnodon* sp.
(Fig. 18)

Four dentary fragments (SAM P24906, with P_3M_2; P26518 - partial M_4; P29899 - with M_{3-5}; P29900 - edentulous; P31796 - isolated M_4), a complete left maxilla (P31782), an isolated P^3 (P31336), maxilla fragment with M^2 (P29861) and isolated M^5s (P29914, P31789) belong to a small species of *Protemnodon* Owen(Table 7). The cheek teeth generally fall at the low end of the size range of *P. chinchillaensis* Bartholomai and within those of *P. suewini* Bartholomai and *P. otibandus* Plane. P^3 is just outside the range of all these species while P_3 is shorter and broader than those of *P. chinchillaensis* tabulated by Bartholomai (1973), and stouter than that of *P. suewini* (Bartholomai 1978). The P^3 (P31336) is well preserved, though well worn and is almost a match for P^3 of P31782. It is distinguished by being relatively narrow - the lingual cingulum being reduced in width -except for an abrupt expansion for the hypocone. The longitudinal crest has four cusps anterior to the worn metacone, as in *P. otibandus* and *P. suewini*, but fewer than described for *P. chinchillaensis*, and there is no fossette discernible posterior to the worn metacone-hypocone crest, unlike that in the above species. The M^2 resembles *P. chinchillaensis* also in form, but has a distinct

Table 6. Cheek tooth measurements in millimetres of the smaller macropodines cf. *Baringa* sp., *Baringa* sp. cf. *B. nelsonensis*. *Troposodon* sp. cf. *T. bowensis* from Corra Lynn Cave: u = unerupted a = approximate.

Specimen	Tooth	P2	P3	M1	M2	M3	M4	M5
cf. *Baringa* sp.								
SAM P31788	upper	-	7.1 x 3.3		5.8 x 4.7	8.5 x 5.0	7.3 x 5.6	-
P26547	lower	-	-	-	5.5 x 4.1	6.2 x 4.7	7.6 x 5.5	u
P26548		-	7.3 x 2.5	-	4.9 x 3.9	5.8 x 4.6	6.8 x 5.2	7.5 x 5.0
P26550		-	-	-	-	-	-	u
P29863		-	6.2 x 2.1	-	4.7 x 3.9	5.7 x 4.2	7.0 x 5.1	7.0 x 5.1
P29902		4.5 x 2.4	-	4.6 x 3.0	4.8 x 3.7	5.8a x 4.3	7.1 x 4.9	u
P29923		-	-	-	-	6.1 x 4.1	-	u
P31337		-	-	-	-	5.5 x 4.5	6.5 x 5.4	7.5 x 5.6
P31794		-	-	-	-	-	7.0 x 5.0	7.6 x 5.1
Baringa sp. cf. *B. nelsonensis*								
P24889	upper	-	8.1 x 4.0	-	5.9 x 5.2	6.8 x 5.4	-	-
P26510		-	8.8 x 4.5	-	6.2 x 5.2	6.8 x 6.0	7.6 x 6.5	-
P26511		6.3 x 3.8	9.0 x 4.0	6.2 x 5.2	7.2 x 6.1	-	-	-
P26551		-	-	-	7.2a x 6.5	9.5a x 6.7	8.8 x 6.7	-
P29869		-	-	-	5.8 x 5.2	6.8 x 5.5	7.7 x 6.0	-
P29903		-	-	-	7.0 x 5.6	7.4 x 6.0	-	-
P31338		-	-	5.6 x 4.3	6.0 x 4.9	-	-	-
P24887	lower	-	-	-	5.9 x 4.5	6.6 x 5.2	7.7 x 5.3	8.0 x 5.2
P26549		-	6.4 x 2.9	-	6.3 x 5.0	7.2 x 5.6	8.5 x 6.4	9.8 x 6.2
P29865		-	-	5.6 x 3.8	-	-	-	-
P29919		-	-	-	4.6	7.0 x 5.0	8.3 x 5.6	u
P29920		-	7.8 x 2.7	-	- -	9.0 x 5.6	-	
P29921		6.0 x 2.7	8.1u	6.0 x 4.1	6.8 x 5.0	8.5 x 5.4	-	.
P29922		6.7 x 2.2	6.9a,u x 2.8	-	6.2 x 4.8	7.6 x 5.2	8.0 x 5.4	-
P29927		-	-	-	-	-	-	8.7 x 5.3
P31789		-	-	-	-	-	7.9 x 5.3	-
Troposodon sp. cf. *T. bowensis*								
P22918	lower	-	-	-	-	10.0 x 7.0	11.5 x 8.0	-
P24888		7.2 x 3.3	u	-	-	-	-	-
P26546		-*	9 a x 3.9	-	7.8a x 6.0	9 a x 7.0	10.2a x 8.0	11.8 x 8.2
P31793		-	9.0 x 3.5	-	7.8 x 5.8	-	-	-
P31795		-	-	-	-	-	-	11.0a,u

forelink which unequally divides the precingulum. In this feature it is like *Wallabia bicolor* (Desmarest) and unlike Pleistocene species of *Protemnodon*. Bartholomai's figure (1973, pl. 20, fig. 2) seems to indicate this structure but it is not specifically mentioned in the text.

Protemnodon sp. cf. *P. chinchillaensis* also occurs at Bow, N.S.W. (Flannery and Archer 1984), while *P. otibandus* is from the Pliocene Awe Fauna of Papua New Guinea (Plane 1967) and Kalimnan of Victoria (Plane 1972) and *P. snewini* is from the early Pliocene Allingham Local Fauna of north Queensland (Bartholomai 1978).

Simosthenurus Tedford
Species 5: *Simosthenurus cegsai* n. sp.
(Fig. 19)

Type Material. HOLOTYPE: SAM P31800, a left dentary lacking only the incisor.

Referred specimens. SAM P29917, a left maxilla fragment with M^{4-5}; P30027 a right maxilla fragment with M^4; P30153, a possible M^1; P31335, a right dentary fragment with M_3; P29872, and P29891, isolated left lower incisors. Several upper incisors may also be ascribed to this species.

Type locality. Corra Lynn Cave (5YI), 3 km south of Curramulka, Yorke Peninsula, South Australia.

Diagnosis. A small sthenurine with relatively short, massive dentary, short diastema, low crowned molars: therefore, *Simosthenurus*. A *Simosthenurus* with massive jaw and small low crowned molars, with simple low midlinks and barely discernible cristids obliquae. Premolar P_3 long, narrow, rectangular; longitudinal crest central except in posterior third where it veers lingually; short posterobuccal crest tending diagonally (anterobuccally) and less than one third the tooth length; only slight increase in posterior

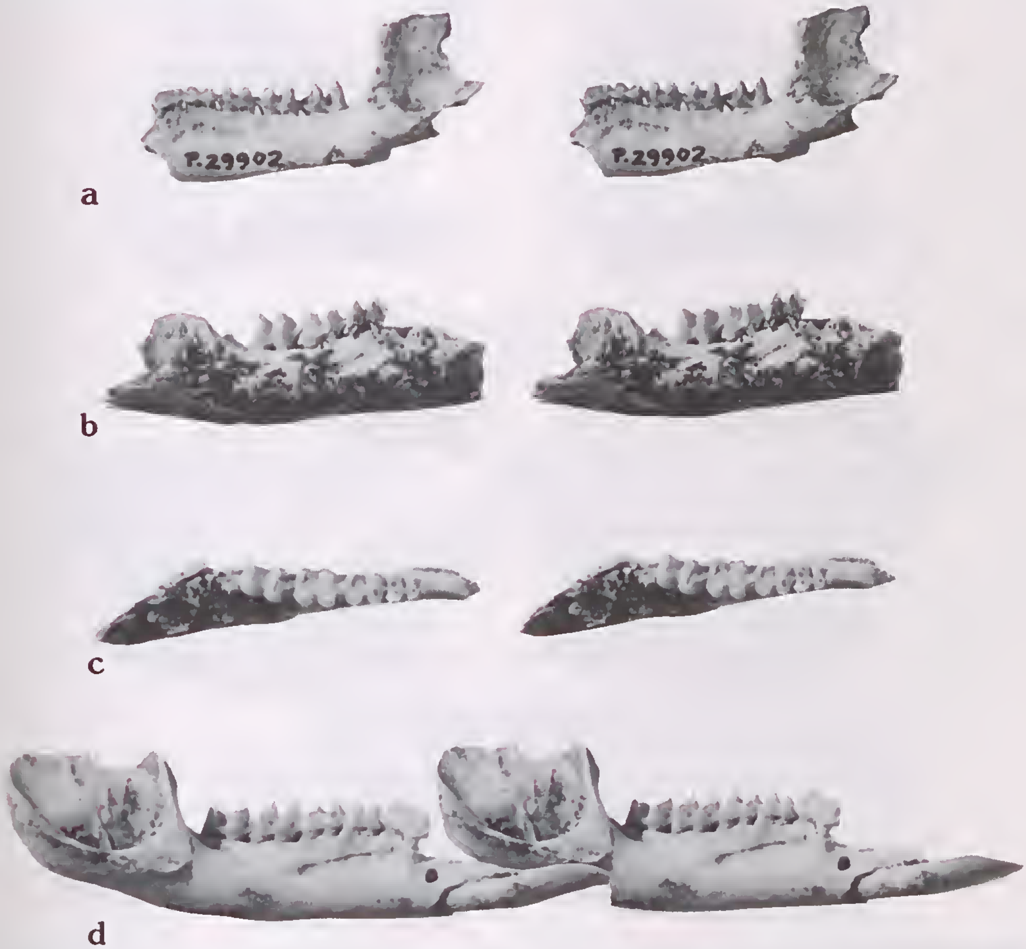

Fig. 15. cf. *Baringa* sp., dentaries in lateral and occlusal stereoview; **a**, P29902; **b**, P26547; **c**, P29863; **d**, P26548. Natural size.

Table 7. Cheek tooth dimensions (mm) of *Protemnodon* sp. from Corra Lynn Cave, compared with averages for other Pliocene species.

Specimen		P3	M2	M3	M4	M5
Protemnodon sp. (Corra Lynn)						
uppers						
SAM	P31336	18.1 x 8.2	-	-	-	-
	P31782	17.2 x 8.5	10.2 x 10.1	12.0 x 11.8	12.4 x 11.7	12.7 x 10.8
	P29861	-	10.1 x 9.7	-	-	-
	P29914	-	-	-	-	14.1 x 11.6
	P31787	-	-	-	-	13.2 x 10.9
lowers						
	P24906	15.1 x 6.5	-	-	-	-
	P26518	-	11.3 x 8.4	-	-	-
	P29899	-	-	13.9 x 9.0	13.6 x 10.2	13.5 x 9.8
	P31796	-	-	-	13.9 x 10.0	-
P. chinchillaensis						
upper		19.5 x 8.7	11.0 x 10.3	12.5 x 11.7 .	14.2 x 12.3	14.3 x 12.1
lower		17.1 x 5.5	10.6 x 8.0	12.1 x 9.1	13.6 x 9.9	14.1 x 9.7
P. otibandus						
upper		19.0 x 8.8	10.8 x 10.8	12.1 x 11.6	13.4 x 11.7	13.5 x 10.5
lower		15.9 x 6.1	9.9 x 8.2	11.7 x 9.2	12.8 x 10.1	13.8 x 9.9
P. snewini						
upper		15.8 x 6.6	10.4 x 9.1	12.3 x 10.3	13.0 x 11.2	13.9 x 11.2
lower		15.0 x 5.0	9.9 x 6.8	12.3 x 8.3	13.1 x 8.8	13.8 x 9.1

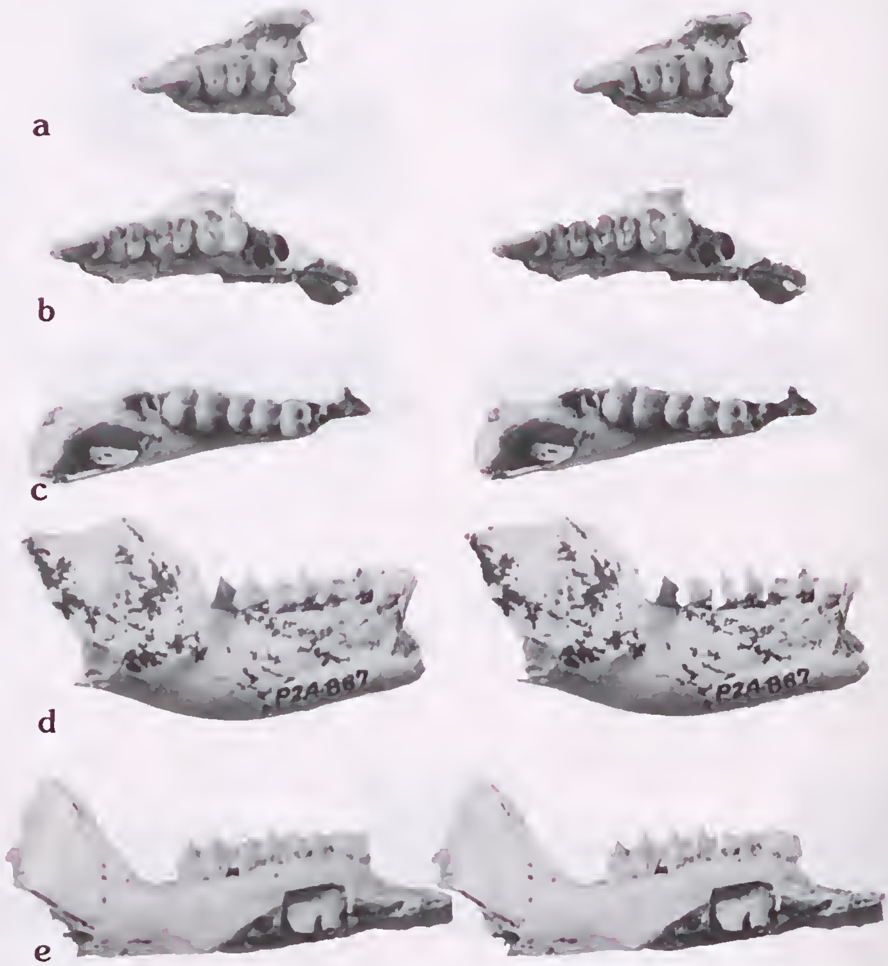

Fig. 16. cf. *Baringa nelsonensis*, stereopairs; **a**, maxilla P24889; **b**, maxilla P31788; **c**, dentary P29919; **d**, dentary P24887; **e**, dentary P29921. **a-c** in occlusal view, **d**, **e** in lateral view. Natural size.

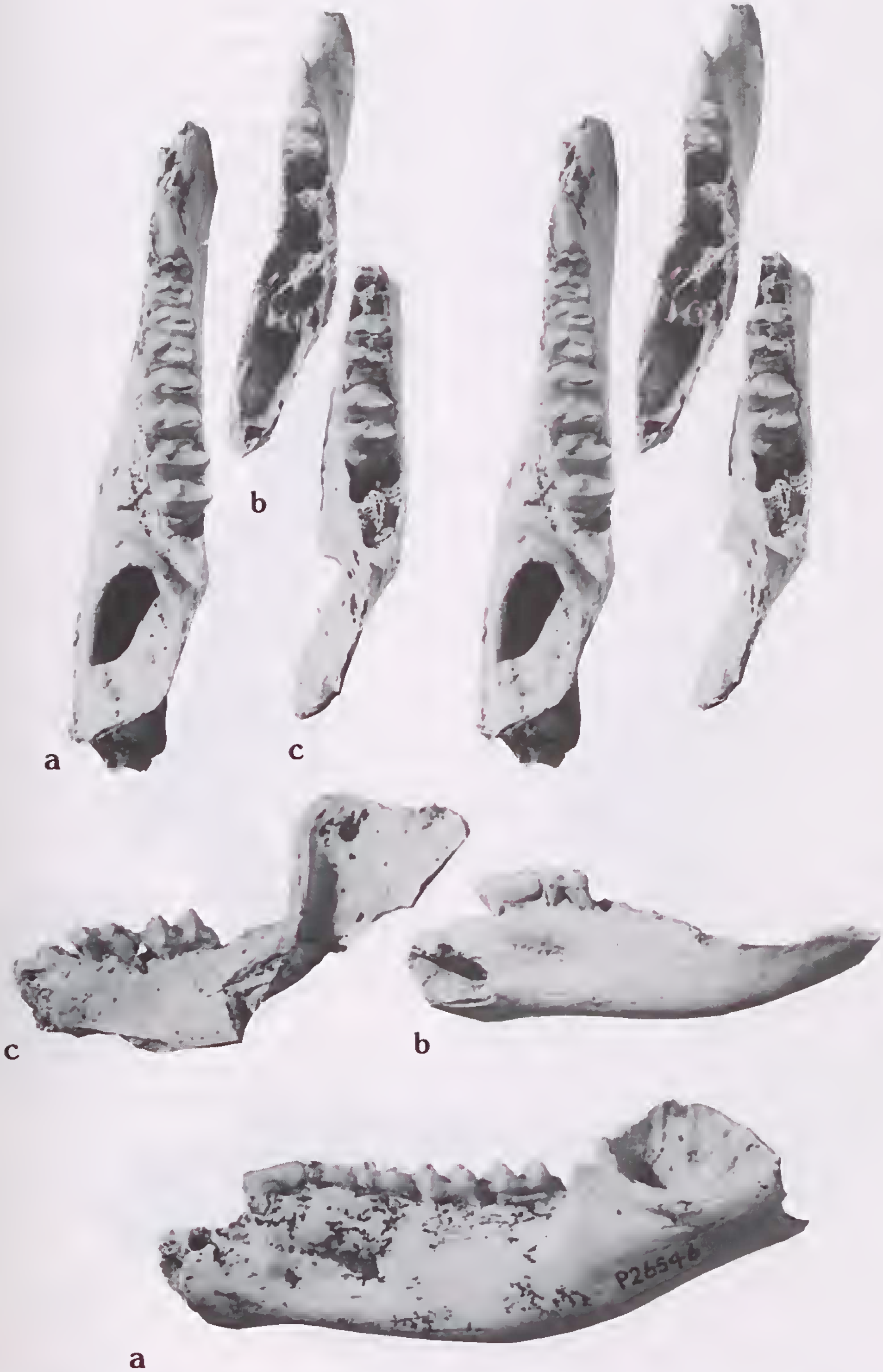

Fig. 17. *Troposodon* sp. cf. *T. bowensis*, dentaries in occlusal (stereopair) and lateral views; **a**, P26546; **b**, P31793; **c**, P29918. Natural size.

width; four pairs of transverse grooves on longitudinal crest. Differs from Chinchilla local fauna (Pliocene) taxa *Simosthenurus antiquus* (Bartholomai) and *Sthenurus notabilis* Bartholomai and most Pleistocene species in being much smaller. Differs from *Sthenurus gilli* Merrilees and *Simosthenurus maddocki* (Wells and Murray) in having larger molars, and more massive dentary. Differs from all other *Simosthenurus* species in having dentary only slightly deeper at M_5 than at P_3; in narrow rectangular shape of P_3; in central position of longitudinal crest on P_3; in having short, rather diagonal, posterobuccal crest on P_3; in having only four pairs of transverse grooves on longitudinal crest of P_3; in showing little expansion of the posterior third of P_3.

Description. The species is smaller than the Pliocene (Chinchilla L.F.) taxa *Simosthenurus antiquus* and *Sthenurus notabilis*, and most Pleistocene species. The teeth are larger than those of *Sthenurus gilli* and *Simosthenurus maddocki* but smaller than those of *Simosthenurus occidentalis* (Glauert) from Naracoorte, S.A., from which they differ only slightly morphologically, notably in simpler, less developed crenulations of the enamel and lower crown height. (Table 8).

The molars are roughly the size of those of *Sthenurus atlas* (Owen) except for being very

Fig. 18. *Protemnodon* sp.; **a**, P31782, left maxilla in occlusal view, stereopair; **b**, **c**, dentary fragments in lateral view; **b**, P29899; **c**, P24906. Natural size.

low-crowned, and the molar tooth row length approximates that of *Sthenurus atlas*. Morphologically the lower molars are simple with low midlinks and barely discernible cristids obliquae. There are also no obvious crenulations on the faces of the lophids. However, the premolar P_3 is the most striking feature. Its characters seem to be plesiomorphic for the subfamily: long narrow rectangular shape, longitudinal crest central except in the posterior third where it veers lingually, short posterobuccal crest trending diagonally (anterobuccally) and less than one third the tooth length. Only a slight increase in posterior width. Only four pairs of transverse grooves on the longitudinal crest. All Pleistocene species show a massive posterior expansion at the buccal crest with a developing longitudinal valley and with many ridges, often irregular, crossing it. The almost perfect dentary, P31800, sheds more light on this taxon. The jaw is slightly larger than that of *Sthenurus gilli* but quite massive - as much as *Simosthenurus gilli* - although only slightly deeper at M_5 than at P_3, unlike later *Simosthenurus* species. Pleistocene species of *Simosthenurus* also show a posterior deepening of the dental ramus, and are not so robust, whereas *Sthenurus* species (of this tooth size) have elongate gracile jaws.

Although the upper molars resemble those of *P. chinchillaensis* in size (Table 8), they display the (albeit barely discernible) overlap of the postmetacrista and posthypocrista on the hypoloph, a character which Flannery (1983) asserts as helping to define the Sthenurinae. The feature is better seen on P30153 (but in this writer's experience is not seen on all Sthenurine specimens).

It appears that this is the earliest species of *Simosthenurus* yet recorded (see discussion on age of the deposit, below).

Etymology. In recognition of the help of members of the Cave Exploration Group of South Australia, Inc. (CEGSA).

DISCUSSION AND CONCLUSION

It is difficult, with so many species only tentatively identified or apparently new, to make definite statements about the fauna. The overall aspect of the assemblage, with its particular combination of species, suggests considerable antiquity for a cave deposit, most of which in Australia seem restricted in age to the Late Pleistocene. Certain species (e.g. cf. *Baringa nelsonensis)* suggest an early Pleistocene date. Others (*Palorchestes* sp. cf. *P. painei, Troposodon* sp. cf. *T. bowensis, Protemnodon* sp.) indicate a Pliocene age, while a few (cf. *Ilbandornis* sp., zygomaturine indet.) hint at a late Miocene age.

The evidence of age afforded by the dromornithid bones, referred to *Ilbandornis* sp., is admittedly weak. These bones are not particularly diagnostic, or, in the case of the atlas, well known. *Ilbandornis* is described only from the late Miocene Alcoota Fauna, so its range and evolution is unknown. The diprotodontoid teeth provide only slightly stronger evidence for age. The *Palorchestes* molars (Pledge 1991) show a greater similarity to those of *P. painei* from Alcoota - particularly in their relatively low crowns - than to the younger *P. parvus* which have higher-crowned molars. The zygomaturine premolar shows a mixture of characters and, while not referable to *Kolopsis* species, does not fit *Zygomaturus* species either. In the form of its parastyle, this tooth shows a slight similarity to undescribed Miocene species from Riversleigh (Qld) and Bullock Creek (N.T.) (S. Hand, pers. comm. 1991).

The Curramulka faunal list is rather similar in general composition to that of the Hamilton Local Fauna (Turnbull and Lundelius 1970, Rich 1991), and therefore suggests a similar environmental niche dominated by forest and woodland species. The similarities between these faunas are as interesting as the differences. Notable similarities are the presence of a species of

Table 8. Cheek tooth dimensions of *Simosthenurus cegsai* from Corra Lynn Cave.

Specimen		P3	M1	M2	M3	M4	M5
Upper							
SAM	P29917(1)	-	-	-	-	12.5 x 11.9	12.0 x 11.3
	P30027(r)	-	-	-	-	13.2 x 12.3	-
	P30153	-	9.7 x 9.7	-	-	-	-
Lowers							
	P31335(r)	-	-	-	13.8 x 11.2	-	-
	P31800(1)	14.6 x 7.4	-	10.8 x 10.3a	12.8 x 11.1	13.2 x 11.5	11.8 x 10.7

Palorchestes nearer to *P. painei* than to *P. parvus*, a giant ringtail (*Pseudokoala erlita* at Hamilton), and the total absence of rodents. Among the possible differences are the identity of the Hamilton macropodids, which include several large and small species, the latter being originally referred to modern genera. Unfortunately, nearly all Hamilton specimens are isolated teeth which

Fig. 19. *Simosthenurus cegsai* sp. nov.: **a**, P31800, holotype left dentary in lateral view; **b**, P31800 holotype dentary; **c**, P30027, right maxillary fragment; **d**, P29917, left maxillary fragment. **b, c** stereopairs in occlusal view. Natural size.

makes identification more difficult. However, none of the small Hamilton wallabies show affinities with those from Curramulka, where no modern macropodid genera are recognised. The larger Hamilton macropodids, which include *Simosthenurus* (Rich 1991), have not been described and/or identified and therefore cannot be compared with the Curramulka species. However, it appears that the Curramulka Local Fauna is at least as old as, and probably older

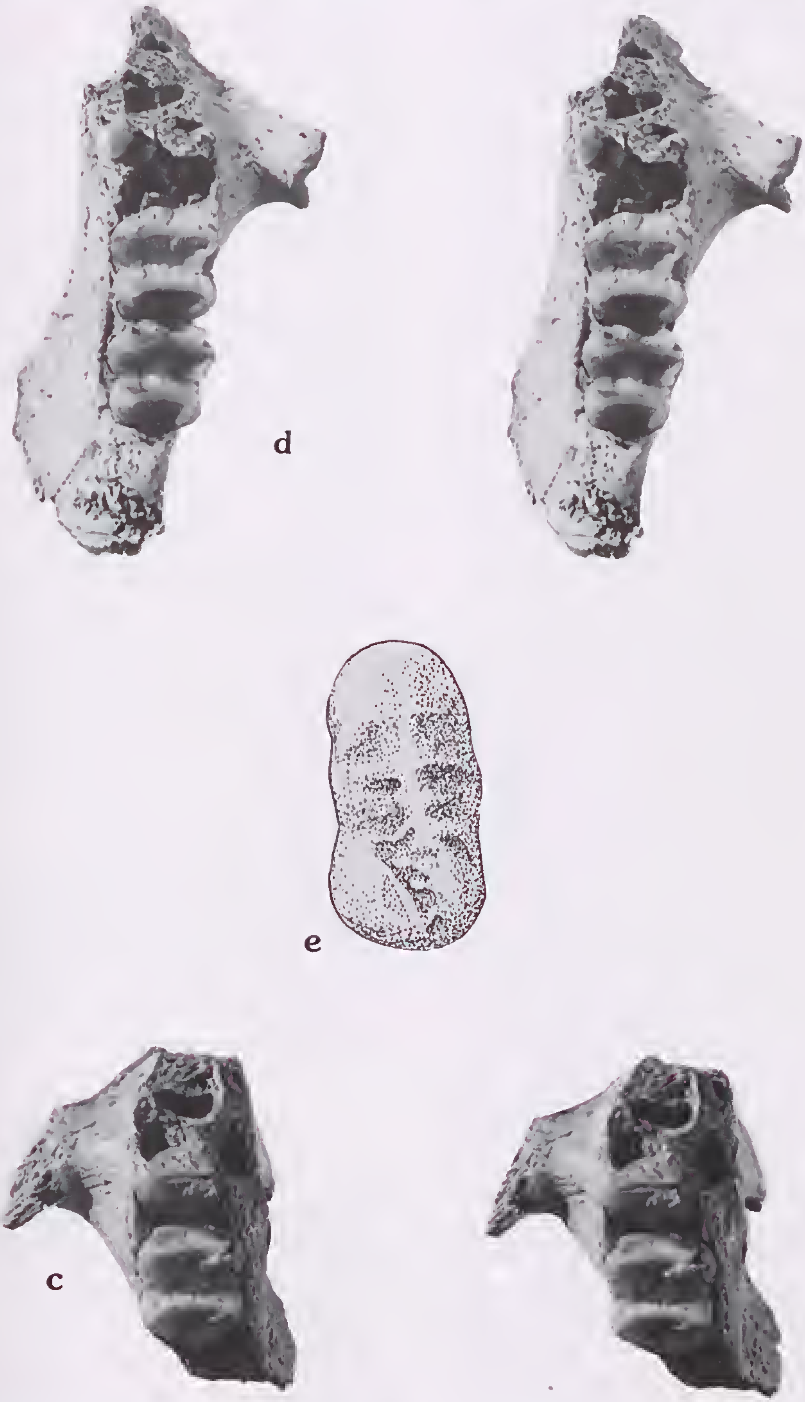

Fig. 19. (cont.): *Simosthenurus cegsai* sp. nov.; **d**, P29917, left maxillary fragment, stereopair in occlusal view; e, detail of premolar (x2.5 approx.). Natural size except **e**.

than, the Hamilton Local Fauna's 4.46 million years.

Conversely, comparison with the estimated early to mid Pliocene Bluff Downs and Bow Local Faunas indicates few faunal resemblances. These assemblages both contain macropodids of more modern, hypsodont morphology, often referred to modern genera, and are therefore considered to be younger than the Curramulka Local Fauna.

The rather abundant small Curramulka macropodines referred to *Baringa* are anomalous. *Baringa nelsonensis* is regarded as an early Pleistocene species (Flannery and Hann 1984) and is associated, *inter alia,* with a small *Palorchestes* and a giant pseudocheirid, both undescribed. It is therefore possible that the Curramulka Local Fauna is only as old as early Pleistocene - refuted by the presence of acknowledged Pliocene species and the lack of modern genera - or is a mixed assemblage, a common and frustrating problem in cave deposits (e.g. Archer 1974). The latter hypothesis must also explain the lack of modern macropodine genera as well as the absence of bandicoots and rodents. It is inconceivable that the mixing and sorting processes that can occur in a cave situation could preferentially remove such distinctive items as rodent jaws (and particularly incisors) and limb bones and bandicoot jaws while leaving small potoroid and dasyurid jaws, *Baringa* teeth, *Wonambi* teeth, elapid vertebrae and frog bones, especially when bandicoots and rodents are so abundant in Pleistocene cave deposits (e.g. Pledge 1990). Despite fine screen sieving of the Corra Lynn sediments no bandicoot or rodent remains have been found. The absence of bandicoots is puzzling, since they are so abundant in Miocene Riversleigh deposits (Archer *et al.* 1989) and in Pleistocene cave deposits (e.g. Pledge 1990) and are not uncommon in the Lake Eyre Basin deposits which are close to being biocoenoses. They are uncommon in the Alcoota deposit (Woodburne 1967b) which tends to be more of a megafaunal thanatocoenosis.

The absence of rodents, on the other hand, may be significant. They may not yet have arrived in southern Australia when the cave assemblage lived. Even the date of rodents' arrival in northern Australia - at Bluff Downs and Rackham's Roost (Riversleigh) - is subject to scrutiny, being based on long distance faunal and geological correlation (Rich 1991). The oldest published Australasian rodent occurrences are in the Awe Local Fauna (Plane 1967), Bluff Downs Local Fauna (Archer and Wade 1976), Chinchilla Local Fauna (Hand 1984, Godthelp 1990), and Rackham's Roost Local Fauna (Godthelp 1988). The Awe specimen, with a revised age of 2.5 to 3.3 million years (Hoch and Holm 1986), is a mere sliver of enamel of uncertain identity (Plane 1967). The Bluff Downs material is a single upper incisor around 4 to 4.5 million years old, a date that is somewhat doubtful since it derives from a lava flow about 10 km away from the fossil site. Only Rackham's Roost has yielded a rich and diverse rodent fauna, and its age is inferred as being possibly early Pliocene on the basis of single species correlation with Bluff Downs (Rich 1991). Of the Pliocene terrestrial vertebrate faunas in Australia, only the Hamilton Local Fauna is securely dated and it contains no rodents. The absence, therefore, of murids from the Curramulka Local Fauna supports an early Pliocene age for the deposit.

Further support for a considerable antiquity of the deposit is seen in the total absence of hypsodont kangaroos. All the macropodids have low-crowned, simple teeth, as do the diprotodontoids, suggesting a browsing diet and a lack of extensive grasslands in the area of the cave. This does not necessarily indicate a pre-grassland age for the deposit, but Martin (1990) indicates that while grasslands were increasing in southeastern Australia during the late Miocene and Pliocene, they did not become widespread until late Pliocene times. The absence of grazers is typical of pre-Pliocene faunas in Australia.

It is apparent that Yorke Peninsula, now largely cleared for farming and at the time of settlement supporting only a scrubby sclerophyll forest at best (Griffiths 1988, Tate 1890, Tepper 1880), was rather heavily forested, enough to support at least four arboreal mammal species - three of them obligate folivores.

ACKNOWLEGEMENTS

This report would not have been possible without the help of Messrs Graham Pilkington, Max Meth and John Ellis of CEGSA and B. McHenry (S.A. Museum), who collected most of the specimens.

I am grateful also to Professor M. Archer for discussion and provision of several extraneous specimens described herein, and to Mrs D. Lowery for typing the numerous drafts.

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Accepted 28 May, 1992